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ONTARIO WATER
RESOURCES COMMISSION

ANNUAL REPORT 1964

POINT EDWARD

water pollution control plant

DIVISION OF PLANT OPERATIONS

Ontario Water Resources Commission

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Point Edward : water pollution
control plant.
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ONTARIO WATER RESOURCES COMMISSION
OFFICE OF THE GENERAL MANAGER

Members of the Point Edward Local Advisory Committee,
Village of Point Edward.

Gentlemen:

We are pleased to provide you with the 1964 Operating Report for the Point Edward Water Pollution Control Plant, OWRC Project No. 59-S-36.

By continuing the mutual cooperation which has existed in the past, we can look forward to greater progress in the field of water pollution control.

Yours very truly,

D. S. Caverly,
General Manager

General Manager,
Ontario Water Resources Commission.

Dear Sir:

It is with pleasure that I present to you the Annual Report of the operation of the Point Edward Water Pollution Control Plant, OWRC Project No. 59-S-36.

This report presents design data, outlines operating problems encountered and summarizes in tables, charts and graphs all significant flow and cost data.

Yours very truly,

B C Palmer

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

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FOREWORD

This report describes the operation of this project for the year 1964. It includes a detailed description of the project, summary of operation, graphs and charts showing quality and quantity information, and project cost data.

This information will be of value to the municipality in assessing the adequacy of the works in meeting existing requirements and in projecting its capability to meet future expected demands. The cost information will be of particular interest to those concerned with developing and maintaining revenue structures.

The preparation of this report has been a cooperative effort of several groups within the Division of Plant Operations. These include the Statistical Section, Brochures Officer and the Regional Supervisor. However, the primary responsibility for the content has been with the Regional Operations Engineer. He will be pleased to discuss all aspects of this report with the municipality.

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

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POINT EDWARD

water pollution control plant

operated for

THE VILLAGE OF POINT EDWARD

by the

ONTARIO WATER RESOURCES COMMISSION

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DIVISION OF PLANT OPERATIONS

DIRECTOR: B. C. Palmer

Assistant Director: C. W. Perry
Regional Supervisor: A. Beattie
Operations Engineer: P. J. Osmond

801 Bay Street Toronto 5

'64 REVIEW

The average flow to the plant was 182,500 gallons per day which was 32% of the design capacity of the plant. This represents a 2.6% increase in flow over 1963. Good efficiencies were obtained through the plant resulting in a BOD reduction of 34% and a suspended solids reduction of 77.5%. These results were slightly improved over the 1963 results. The digester also provided very good treatment and a total of 6,750 cu. ft. of digested sludge was hauled. A proper chlorination of the final effluent was maintained through the year.

Inspections of the structures and grounds showed that they were well maintained and in good condition. An electrical and mechanical inspection was made of the project equipment and no major deficiencies were discovered. A total of 102 hours was spent by head office technicians at the project during the year.

The sewers were inspected and cleaned during the month of June with assistance from the Village of Point Edward. No major problems were discovered at the time.

The operating cost for the year was $12,451.09 or $186.88 per million gallons of raw sewage treated,a slight increase over 1963 due to an increased cost for water.

The operating cost included a sum of $1543.67 for the payment of water and this cost of water was approximately six times as great as in 1963. In 1964 the Point Edward PUC discovered they had been undercharging for water since the project went into operation and so the 1964 water cost is representative of future water costs.

GLOSSARY

BOD	biochemical oxygen demand (a measure of organic content)
cfm	cubic feet per minute
comminution	shredding of solids into small fragments
DWF	dry weather flow
effluent	outflow
flocculation	bringing very small particles together to form a larger mass (the floc) before settling
fps	feet per second
gpcd	gallons per capita per day
gpm	gallons per minute
grit	sand, dust, stones, cinders and other heavy inorganic material
influent	inflow
lin. ft.	lineal feet
mgd	million gallons per day
mlss	mixed liquor suspended solids
ppm	parts per million
ss	suspended solids
TDH	total dynamic head (usually refers to pressure on a pump when it is in operation)

HISTORY

1956 – 1964

INCEPTION

In 1958, the Village of Point Edward and the Ontario Water Resources Commission initiated plans for the construction of a modern water pollution control plant. In May 1959, the firm of Dunlop, Wardell, Matsui and Aitkin, Architects and Consulting Engineers, was engaged to prepare plans and specifications for the project.

APPROVAL

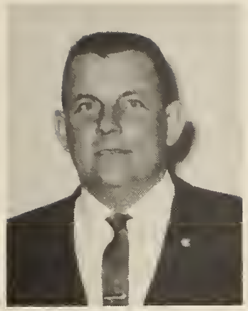
On May 11, 1959, a preliminary agreement was signed between the Ontario Water Resources Commission and the Village of Point Edward to finance, construct and operate the plant and associated facilities.

CONSTRUCTION

Eastern Construction Co. Ltd. and Keystone Contractors Ltd. began construction in early 1960 and by June 1961 the Division of Plant Operations assumed operation.

TOTAL COST

$779,774.00



G. BARWISE
CHIEF OPERATOR

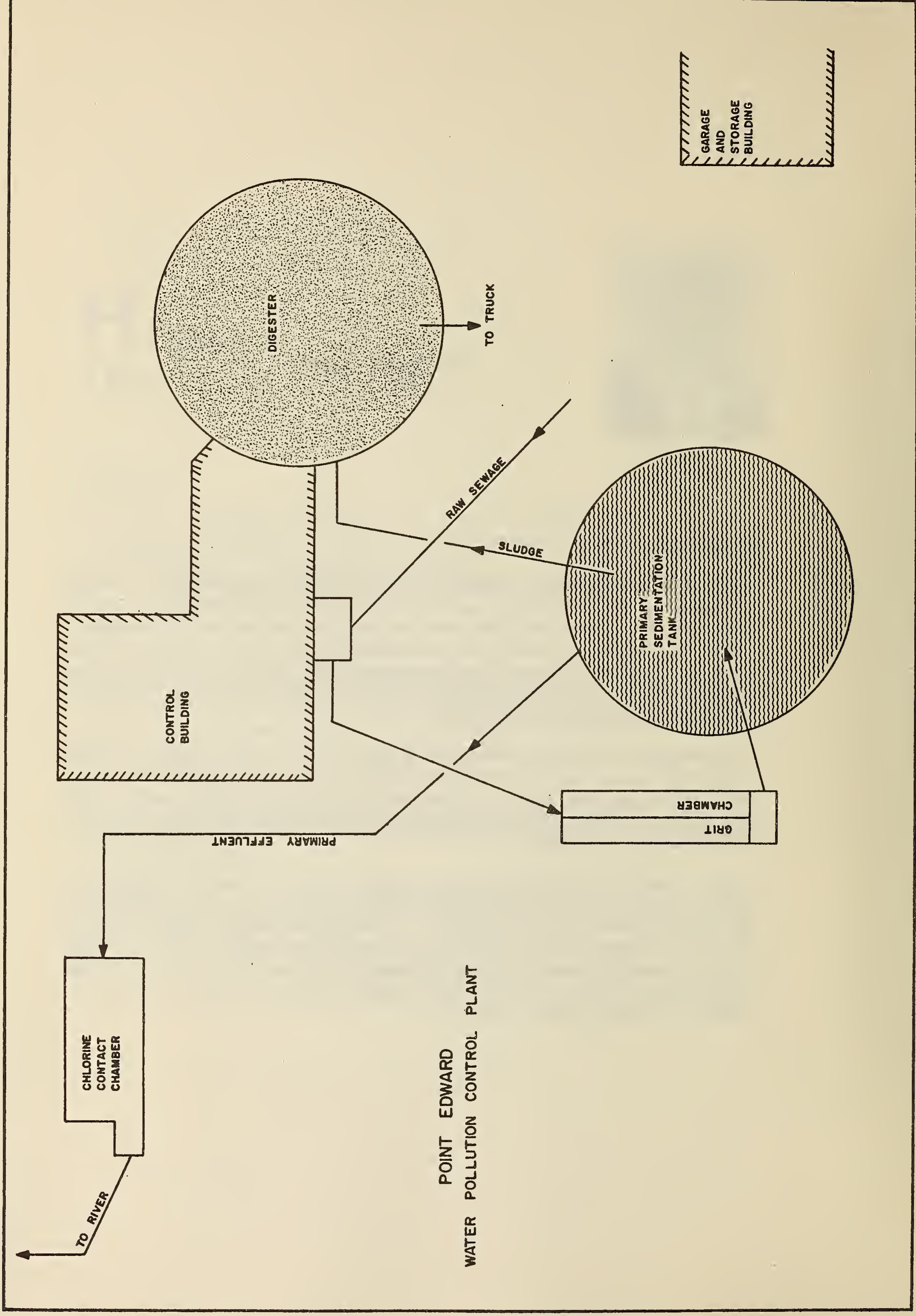
Project Staff

COMMENTS

The Point Edward Water Pollution Control Plant is operated by a single operator. It is possible for one operator, with supervision and technical assistance from the head office staff, to maintain and efficiently operate a project of this size. Casual help is supplied by the Village of Point Edward when the full-time operator requires time off for such reasons as holidays and sickness or when additional assistance is necessary for such duties as inspecting and cleaning the sewers.

Supervision of the plant is based on a total of 40 hours per week, 36 hours occurring during the period from Monday to Friday inclusive and two hours on both Saturday and Sunday. Power failures and high sewage levels in the wet well at the plant are telemetered to the operator's house where an alarm had been installed.

During 1964, Mr. Barwise attended intermediate and senior courses for sewage plant operators given by the OWRC. He obtained good standing in the examinations for both courses. On completion of the senior course he received a Certificate of Qualification as a sewage works operator. He has also successfully completed two correspondence courses, one for sewage works operators and one for water works operators, both given by International Correspondence Schools.



POINT EDWARD
WATER POLLUTION CONTROL PLANT

Description of Project

SEWAGE PUMPING FACILITIES

Because of the level terrain which exists in the Point Edward area, much of the sewage of the village must be pumped to the sewage treatment plant. This is accomplished by underground pumping stations; one located on Helena Street and one located on Michigan Avenue. The sewage from the area around the station flows by gravity to a reinforced concrete wet well, which contains the pump suction line and level sensing devices to signal the on-off operation of the pumps. It is then pumped from the wet well to a point near the plant from which it will flow by gravity.

All the sewage enters the wet well at the plant by means of a 16 inch diameter sewer. From this wet well, the sewage must be elevated to the influent works. This is achieved by two raw sewage pumps equipped with variable speed motors giving a constant flow of sewage through the plant.

INFLUENT WORKS

Coarse material is removed from the incoming sewage by manually cleaned bar screens located in the influent ends of the grit channels. After passing through the screens, the sewage enters two parallel grit channels. In these channels the velocity of the sewage is reduced to approximately one foot per second, allowing the heavier inorganic solids to settle out while maintaining the organic solids in suspension. The grit channels are manually cleaned once each day.

PRIMARY SEDIMENTATION

Following the preliminary treatment of screening and grit removal, the sewage enters the primary sedimentation tank where the major portion of the settleable solids settle to the bottom of the tank. This settled material, primarily organic solids, is called raw sludge. It is continually collected by a revolving scraper arm and deposited in a hopper in the bottom of the tank. The sludge is periodically removed from this hopper by a piston pump and transferred to the digester.

Floating material, i.e. scum, is removed by a surface skimming arm which deposits the material collected in a scum hopper. The same pumps used to transfer the sludge are used to remove the scum which is also pumped to the digester.

DIGESTION

The Point Edward plant utilizes single stage digestion. The sludge and scum are pumped into the digester, where a bacterial process stabilizes the organic material producing a harmless material termed digested sludge and a gas (methane). The digested sludge is removed from the digester by truck and the gas is burned at the plant as a waste product. To expedite the digestion process, sludge is recirculated through a heat exchanger to maintain the temperature of the contents between 90° and 95° F. A reasonably clear liquid termed supernatant is decanted from the upper levels in the digester as raw sludge is added.

CHLORINATION

The effluent from the primary sedimentation tank, having been retained for the design detention period, (see Design Data) passes over the weir and flows by gravity to the chlorine contact chamber where chlorine is added to disinfect the effluent just prior to its being discharged to the St. Clair River.

PROJECT COSTS

TOTAL CAPITAL COST: $779,774.00

The total cost to the municipality during 1964 was as follows:

Net Operating	$ 12,451.09
Debt Retirement	15,736.00
Reserve	5,752.00
Interest Charged	43,870.29
TOTAL	$ 77,809.38

RESERVE ACCOUNT

Balance at January 1, 1964	$ 14,272.41
Deposited by Municipality	5,752.00
Interest Earned	908.25
	$ 20,932.66
Less Expenditures	-
Balance at December 31, 1964	$ 20,932.66

DEBT OUTSTANDING: $721,502.49

MONTHLY COSTS

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	*SUNDRY	WATER
JAN	787.32	373.30		174.31	71.01	106.22	27.11		17.85	17.52	
FEB	699.66	373.30		175.36	59.55		27.97		23.76	39.72	
MARCH	1086.67	420.31		164.91	63.50	(68.78)	18.66	395.11	20.87	72.09	
APRIL	718.67	389.50		161.01	72.99	(68.78)	14.06	110.07		39.82	
MAY	1303.58	584.25		110.09	68.41	106.22	34.38		264.17	72.84	63.22
JUNE	909.76	437.72		88.41	62.60		12.50	11.60		296.93	
JULY	962.18	383.00		72.75	73.89	281.22	76.07			28.14	47.11
AUG	1123.36	389.50		527.33	66.97		16.70		(27.14)	150.00	
SEPT	1299,96	389.50		62.70	76.15	106.22	23.09			642.30	
OCT	761.84	389.50		(378.48)	69.08		19.38		93.58	517.72	51.06
NOV	610.84	389.50		116.55	69.13		22.81			12.85	
DEC	2187.25	584.25		129.57	132.38	(308.90)	3.80	33.27	26.01	204.59	1382.28
TOTAL	12451.09	5103.63		1404.5	885.66	153.42	296.53	550.05	419.10	2094.52	1543.67

* SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE $280.80

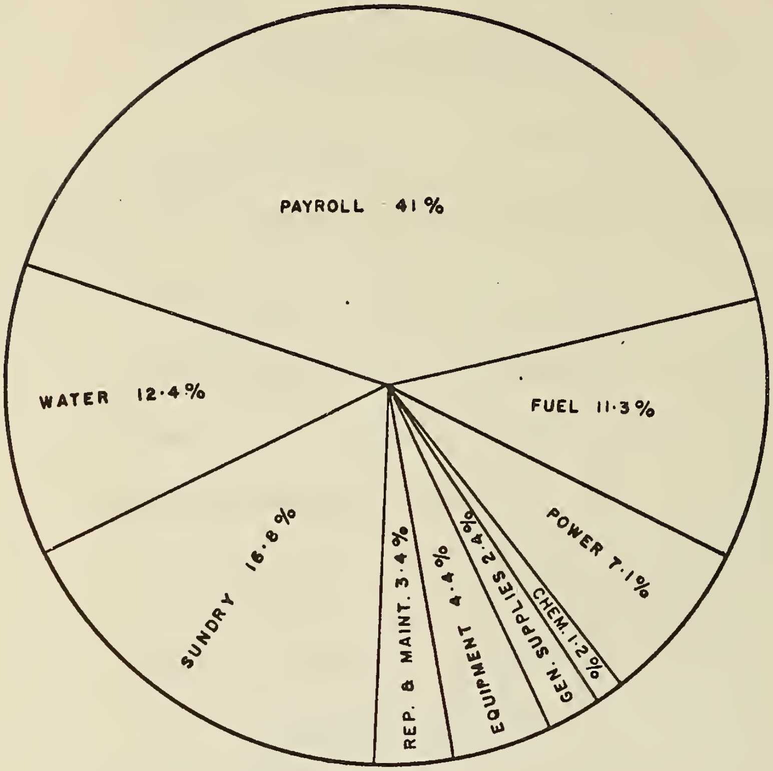
BRACKETS INDICATE CREDIT

YEARLY COSTS

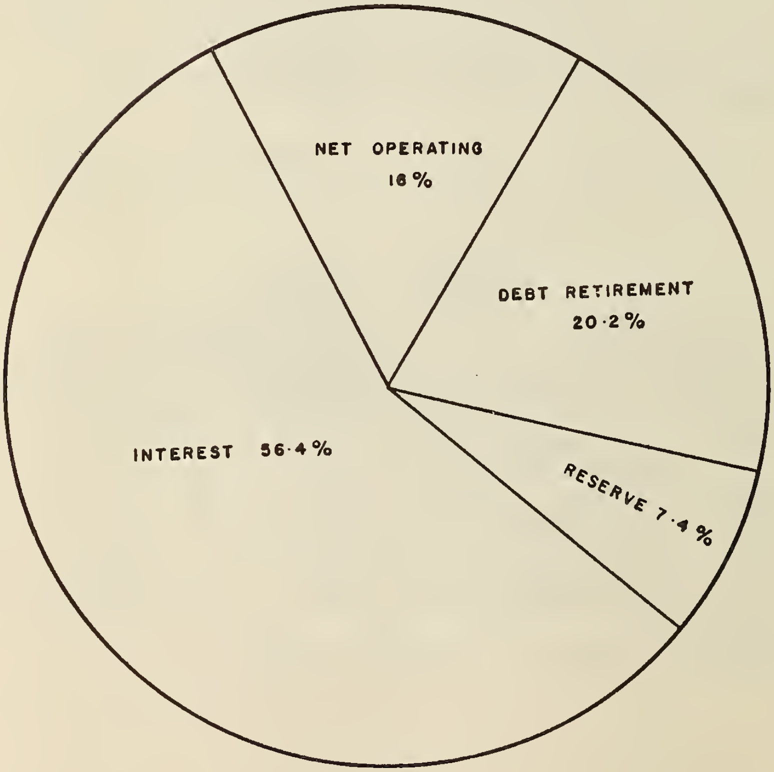
YEAR	M.G. TREATED	TOTAL COST	COST PER FAMILY PER YEAR	COST PER MILLION GALLONS	COST PER L.B. OF BOD REMOVED
1962	56.500	9670.86	13.65	* 171.17	$ 0.15
1963	64.907	11343.38	15.99	174.26	0.22
1964	66.626	12451.09	16.78	186.88	0.23

* BASED ON ANNUAL POPULATION ESTIMATE AND 3.9 PERSONS PER FAMILY

1964 OPERATING COSTS



TOTAL ANNUAL COST



Technical Section

Design—Data

GENERAL

Type of Plant - Primary treatment.

Design Population - 5,700 persons.

Design Plant Flow - 570,000 gallons per day.

Per Capita Flow - 100 gallons per capita per day.

Five Day BOD -

Raw Sewage - 170 PPM
Removal - 35%

Suspended Solids -

Raw Sewage - 200 PPM
Removal - 50%

PUMPING STATIONS

Two Smith and Loveless package lift stations. Helena Street station having two pumps each with a capacity of 750 gpm at 40 foot head. Michigan Avenue station having two pumps each with a capacity of 500 gpm at 20 foot head.

PRIMARY TREATMENT

INFLUENT SEWER

16 inch diameter sewer.

RAW SEWAGE PUMPS

Two Fairbanks-Morse vertical centrifugal pumps each having a capacity of 1080 GPM at 35 foot head, driven by 15 HP Tamper electric motors. There is a 10 inch bypass on the discharge side of the raw sewage pumps.

SCREENING

Bar screens located at the influent end of the grit chambers 1/4 inch by 1 inch bars at 1 1/2 inch centres.

GRIT REMOVAL

Two grit chambers in parallel. Each 16 feet by 1.75 feet by 2 feet equipped with proportional weirs.

PRIMARY SETTLING TANKS

One Dorr-Oliver-Long clarifier with a 30 foot diameter and 10 foot SWD complete with skimmer. Detention time at design flow is 1.85 hours.

RAW SLUDGE PUMP

One Carter piston pump having a capacity of 100 GPM at 20 foot head driven by a 2 HP electric motor.

CHLORINATION

A baffled contact chamber 20 feet by 10 feet by 8.5 feet. Retention time at design flow is 27 minutes. Chlorination is provided by a Builders-Providence chlorinizer with a 20 pound per day orifice and weigh scales.

FLOW

The effluent flows over a weir and is measured by a Bristol totalizer and recording meter.

DIGESTER

One fixed roof heated digester, which is 30 foot in diameter and has a 20 foot SWD. The volume is 15,140 cubic feet providing a digester capacity of 2.66 cubic feet per capita. Digesting sludge is recirculated by a Fairbanks-Morse pump having a capacity of 75 GPM at a 21 foot head. There is also a swing type supernatant selector.

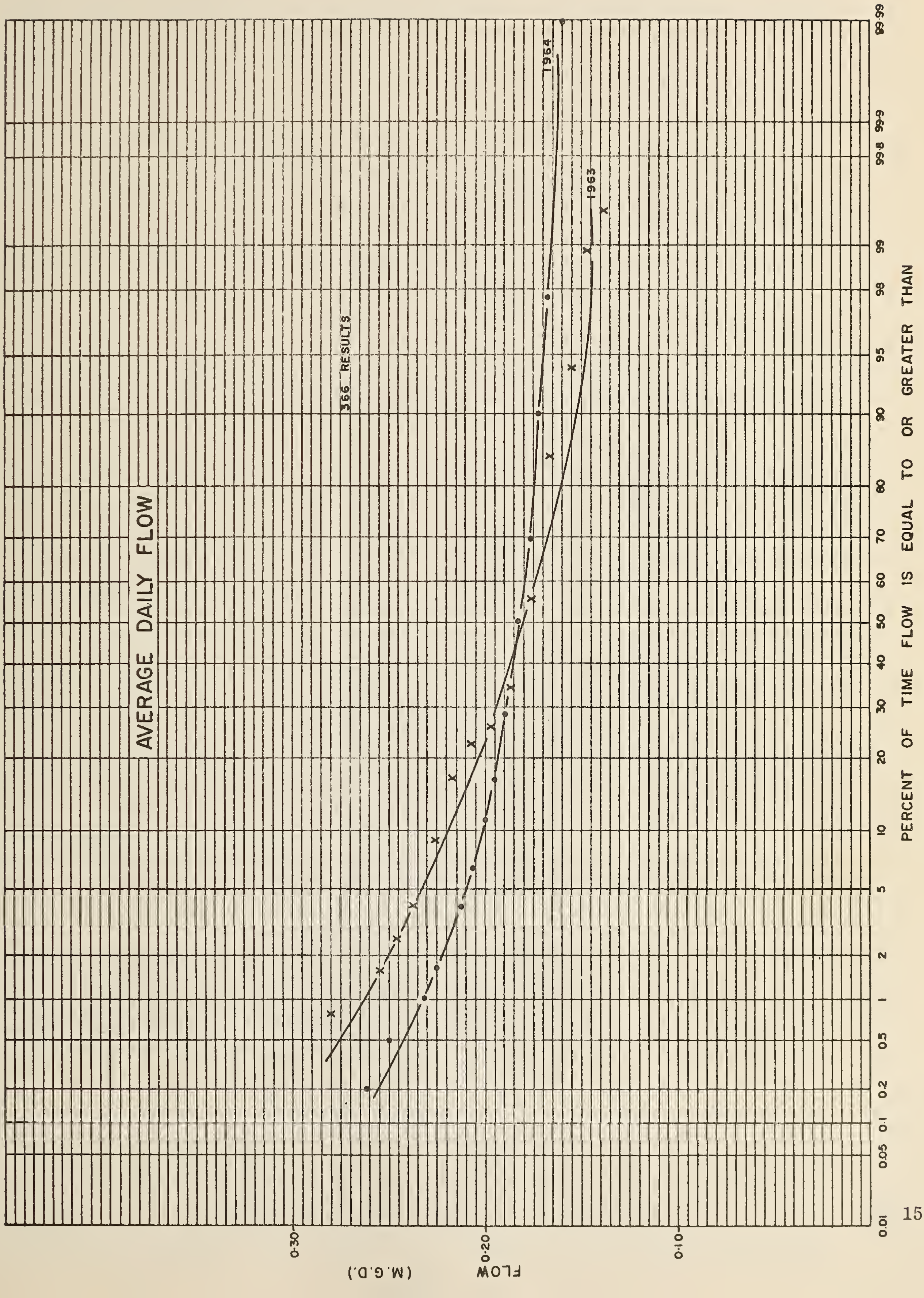
HEAT EXCHANGER

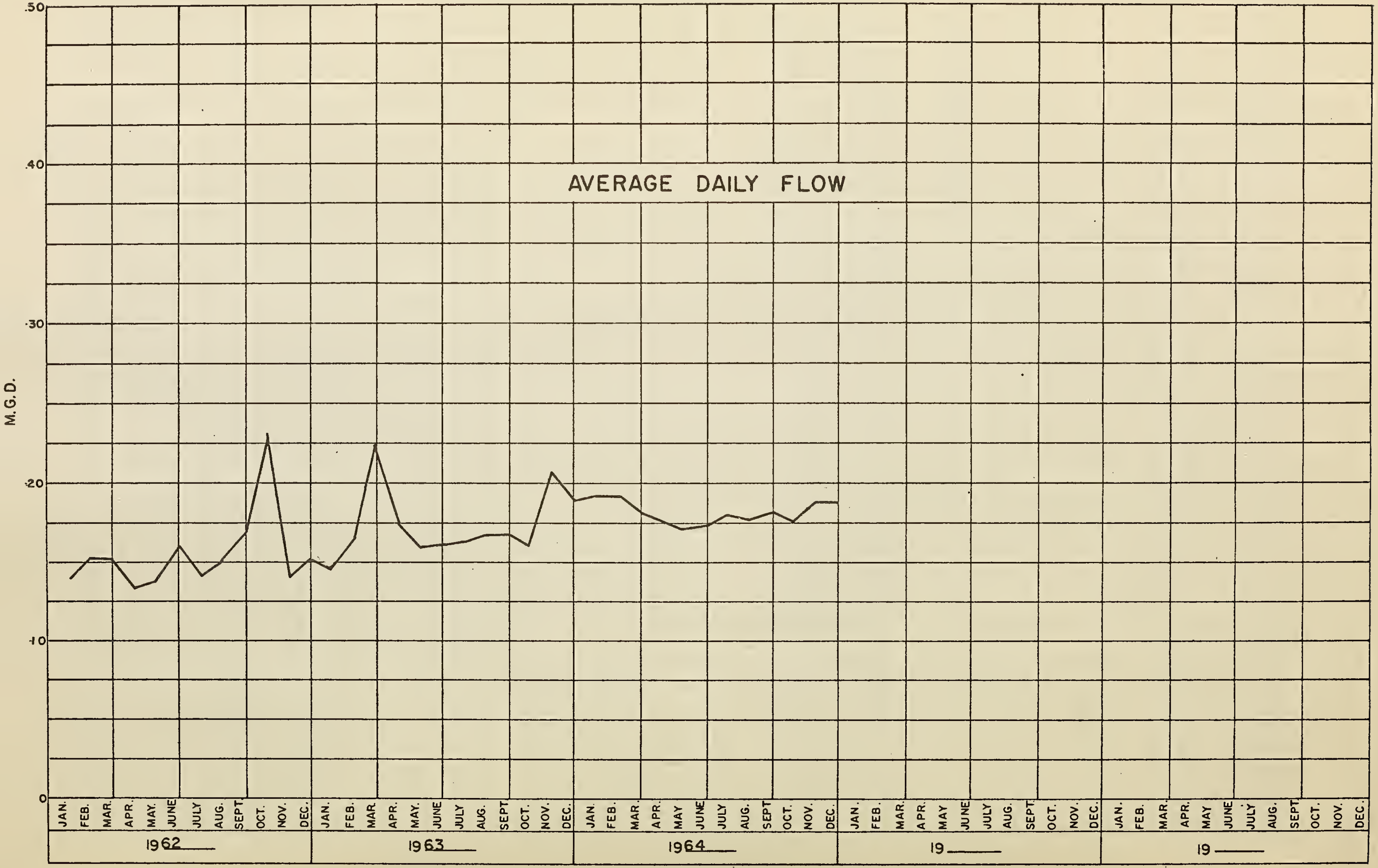
The digester sludge is heated by a Dorr-Oliver-Long spiral hot water heat exchanger heated by a natural gas furnace. There is no provision for utilizing digester gas, which is burned as waste gas.

A Fairbanks-Morse centrifugal pump with 280 GPM capacity at 12 foot head is used for pumping digested sludge to the truck.

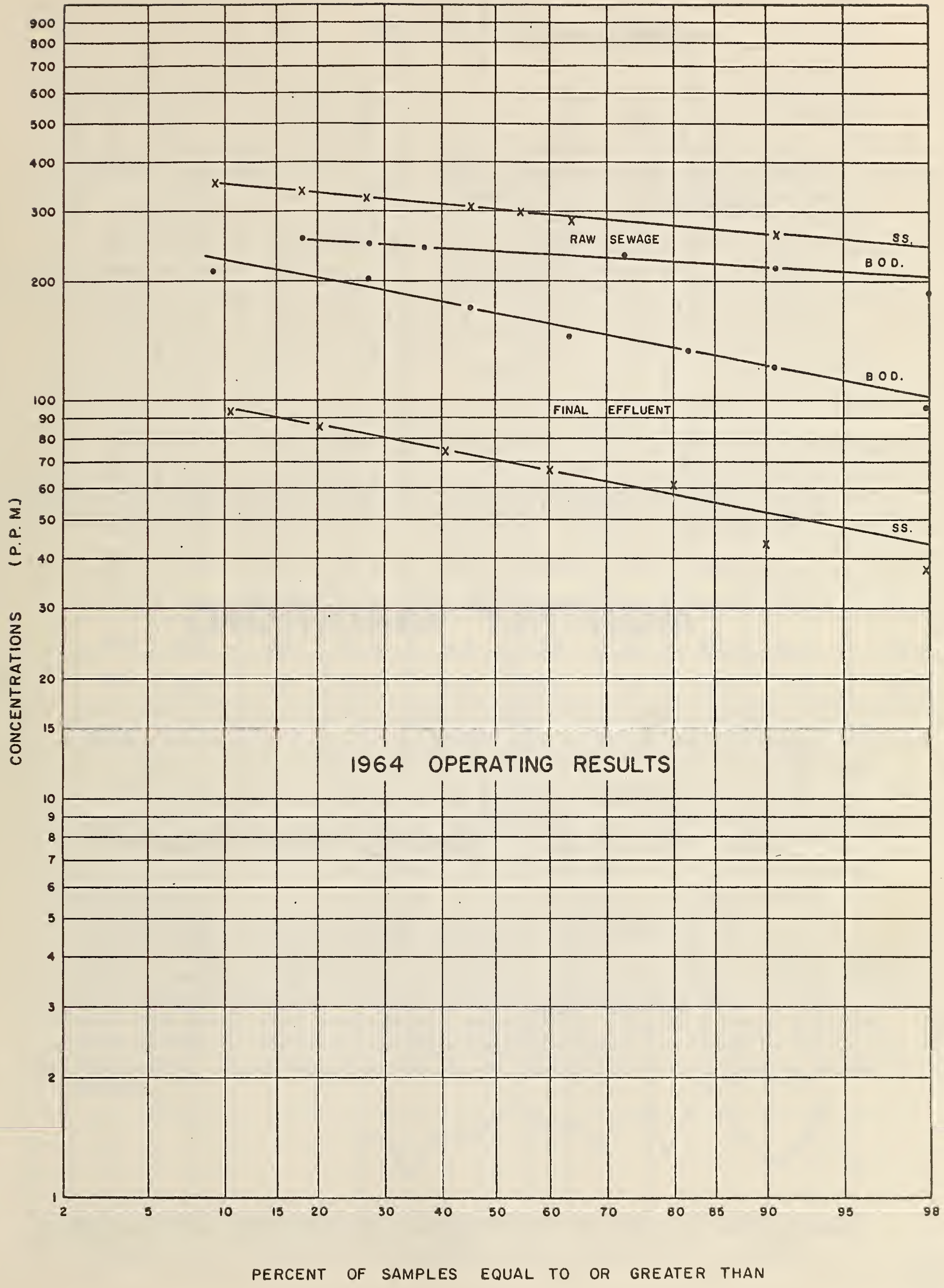
Process Data

A total of 66. 625 million gallons of sewage was given primary treatment during 1964 as opposed to 64. 912 million gallons in 1963. This is an increase of 2. 6%. The average daily flow for the year was 182, 500 gallons giving a plant load factor of . 32 based on the design capacity of 570, 000 gallons per day. The maximum average daily flow for a month occurred in March when the average flow was 193, 500 gallons per day.

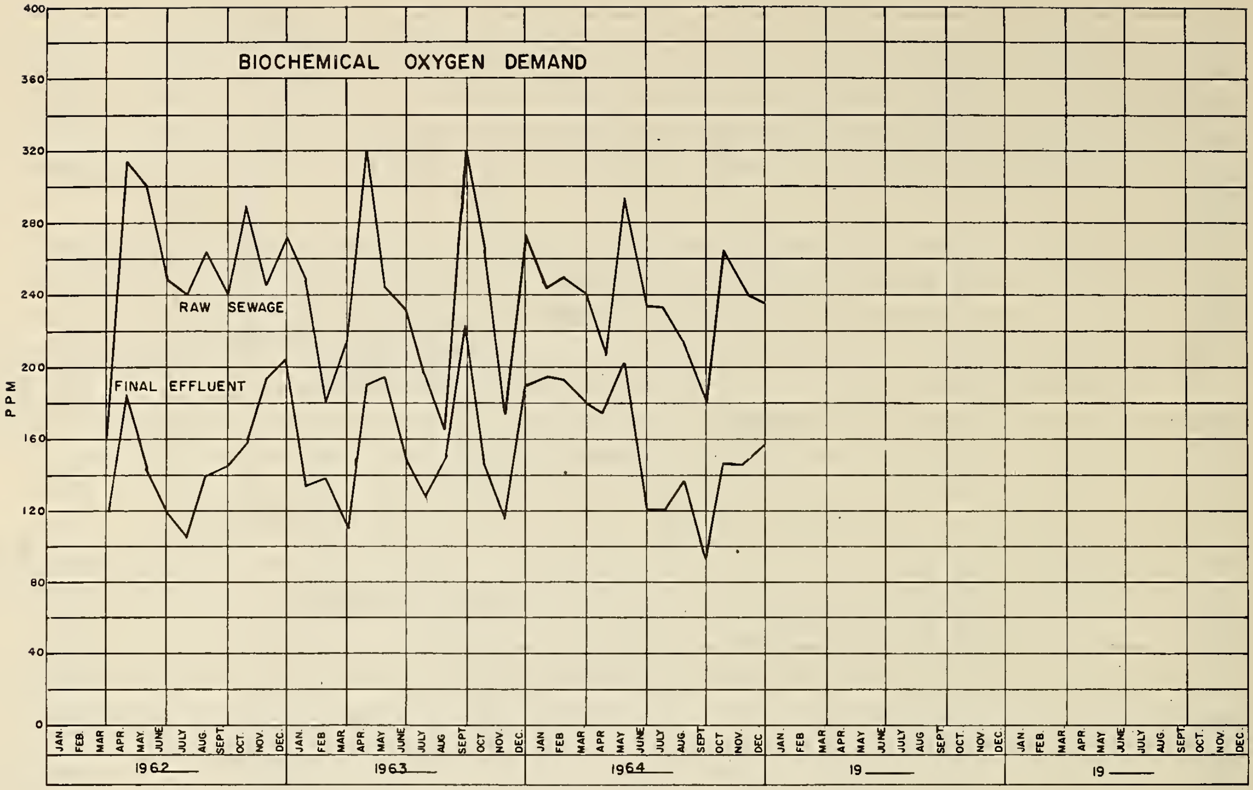

AVERAGE DAILY FLOW



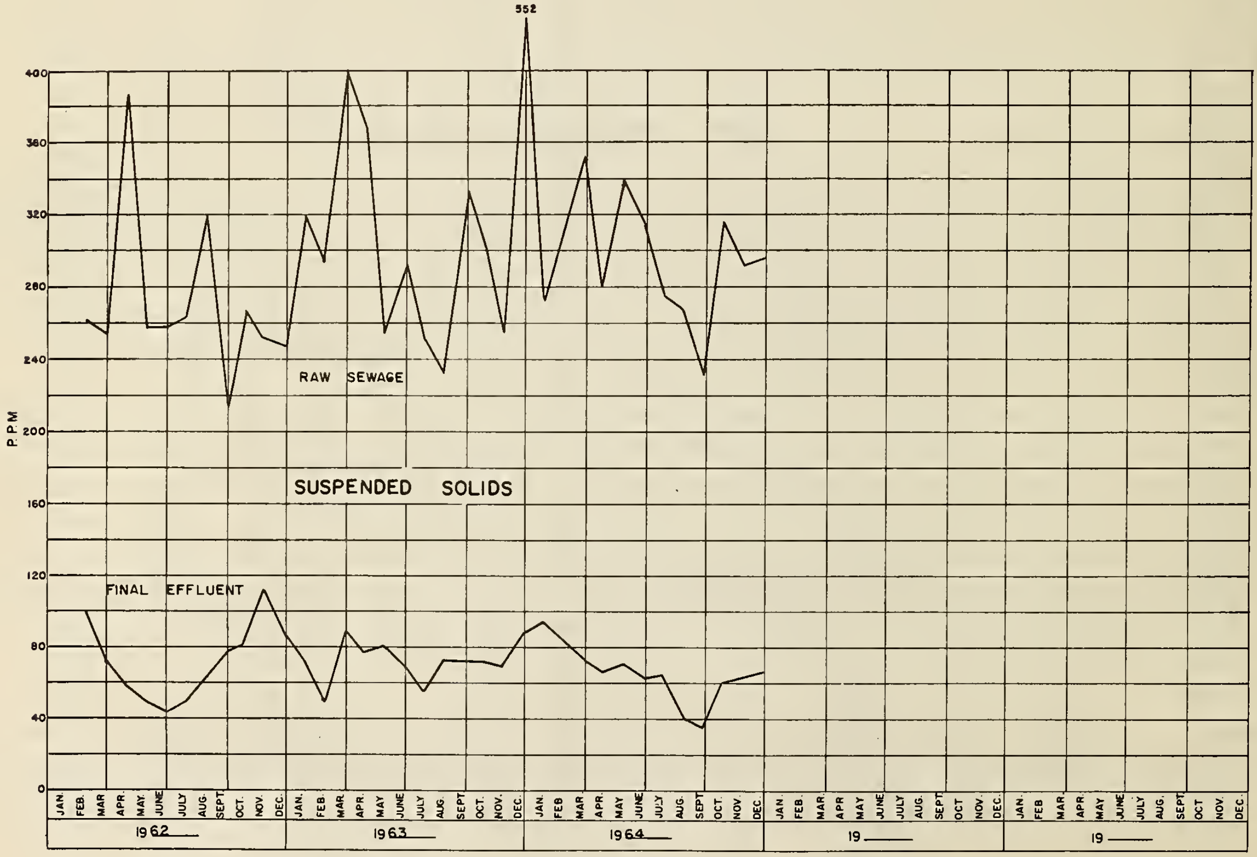
AVERAGE DAILY FLOW
M.G.D.
.50
.40
.30
.20
.10
0
JAN. FEB. MAR. APR. MAY. JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1962
1963
1964
19
19



PERCENT OF SAMPLES EQUAL TO OR GREATER THAN



MONTHLY VARIATIONS



GRIT, B.O.D AND S.S. REMOVAL

MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT P.P.M.	EFFLUENT P.P.M.	% REDUCTION	TONS REMOVED	INFLUENT P.P.M.	EFFLUENT P.P.M.	% REDUCTION	TONS REMOVED	
JAN.	245	195	20.5	1.6	274	95	65.5	5.0	7.4
FEB.	250	195	22	1.5	306	84	72.5	6.2	15.4
MAR.	240	180	25	1.7	352	74	79	7.8	10.4
APR.	210	175	16.5	0.9	282	70	75	5.6	7.2
MAY	295	220	25.5	2	338	72	78.5	7.1	9.6
JUNE	235	120	49.0	3.0	316	64	79.5	6.6	14.8
JULY	235	120	49.0	3.2	276	66	76.0	5.8	25.8
AUG.	215	136	36.5	2.2	270	42	84.5	6.3	32.6
SEPT.	185	92	50.0	2.5	232	36	84.5	5.4	15.9
OCT.	265	150	43.5	3.2	318	62	80.5	7.0	14.4
NOV.	240	148	38.5	2.6	292	64	78.0	6.5	14.6
DEC.	238 *	157	34.0	2.4	296	66	77.5	6.7	13.7
TOTAL	-	-	-	27.2	-	-	-	76.3	181.8
AVG.	238	157	34.0	2.3	296	66	77.5	6.4	15.2

* average value substituted. No sample

COMMENTS

A raw sewage having an average strength of 238 ppm in BOD and 296 ppm in SS was treated in 1964. The treatment at the plant was good providing an average reduction of 77.5% in suspended solids and 34.0% in BOD. One reason for the excellent reduction is the low plant load factor of .32. This allows a detention period in the settling tank of more than double what is considered necessary for adequate primary treatment. The above results are based on a monthly sampling program and should be interpreted with this in mind. An average of 2.7 cu. ft. of grit was removed per million gallons of raw sewage.

DIGESTER OPERATION

MONTH	SLUDGE TO DIGESTERS			SLUDGE FROM DIGESTERS			GAS PRODUCED 1000'S Cu. Ft.
	1000'S CU. FT.	% SOLIDS	% VOL. MAT.	1000'S CU. FT.	% SOLIDS	% VOL. MAT	
JAN.	2.48	-	-	0.48	4.82	3.01	-
FEB.	2.32	2.18	-	0.48	5.48	-	-
MAR.	2.48	0.86	-	0.73	4.89	-	-
APR.	2.40	2.35	1.83	0.48	6.40	3.92	-
MAY	2.48	1.48	1.19	0.48	4.73	2.99	-
JUNE	5.93	0.71	0.58	0.73	3.00	1.99	-
JULY	4.22	5.86	4.61	0.48	4.76	2.83	-
AUG.	4.22	3.62	-	0.48	5.66	-	-
SEPT.	4.09	3.07	2.44	0.48	6.59	3.76	-
OCT.	4.22	4.49	3.70	0.48	6.28	3.57	-
NOV.	3.71	2.41	2.00	0.48	6.00	3.47	-
DEC.	4.04	-	-	0.97	-	-	-
TOTAL	42.59	-	-	6.75	-	-	-
AVG.	3.55	2.70	2.13	.56	5.33	3.19	-

COMMENTS

A total of 42,590 cu. ft. of raw sludge was pumped to the digester at an average solids concentration of 2.70%. A good quality supernatant was obtained and returned to the plant. A total of 6750 cu. ft. of digested sludge at a concentration of 5.33% was hauled and it amounted to 16% of the raw sludge pumped to the digester or 3.75 cu. yd. per million gallons of raw sewage. There was an average reduction in the volatile matter of approximately 70% over the year's operation. The methane produced from the digestion process was burned as a waste product.

Digested sludge was hauled and disposed of at a cost of $1.20 per cubic yard.

CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (P.P.M)
JANUARY	5.957	676	11.35
FEBRUARY	5.605	667	11.90
MARCH	5.631	689	12.24
APRIL	5.289	669	12.65
MAY	5.319	671	12.62
JUNE	5.216	646	12.38
JULY	5.578	752	13.48
AUGUST	5.538	742	13.40
SEPTEMBER	5.470	653	11.94
OCTOBER	5.487	731	13.32
NOVEMBER	5.676	* 449	12.56
DECEMBER	5.860	** 302	10.65
TOTAL	66.626	7647	-
AVERAGE	5.552	690	12.43

* 19 days chlorination
** 15 days chlorination

COMMENTS

Chlorination of the final effluent is practiced 12 months of the year at Point Edward. During 1964, 7647 pounds of chlorine were used to disinfect the final effluent, which was then discharged to the St. Clair River some 1200 ft. downstream from the Sarnia water intake. The average dosage for the year was 12.43 ppm.

CONCLUSIONS

The Point Edward plant is operating at 32% design capacity and has sufficient capacity for present flows. The project is being well maintained and operated and is providing good treatment. The operating costs showed an increase over 1963 and this was due to an increase in the cost for water.

RECOMMEN

A major portion of th orinator and
lawn watering. Since ese purposes
a plant water system ed for these
purposes.

ONTARIO WATER RESOURCES COMMISSION
DIVISION OF PLANT OPERATIONS.
POINT EDWARD WATER POLLUTION
CONTROL PLANT.

ANNUAL REPORT. 1964

DATE	ISSUED TO

ONTARIO WATER RESOURCES COMMISSION